PRELIMINARY STUDY
OF
BREAKWATER AND LANDING
AT
SAN NICOLAS ISLAND

AINSWORTH, DOUGLAS AND FREEMAN - ARCHITECTS

WILSON AND WILSON - ENGINEERS

W.E. Wilson

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AT

SAN NICOLAS ISLAND

FOR

NAVAL AIR MISSILE TEST CENTER

POINT MUGU

CALIFORNIA

AINSWORTH-DOUGLAS-FREEMAN-WILSON & WILSON

Architects & Engineers

Los Angeles, California

OBJECTIVE

To provide a suitable landing facility for the logistic support of the Island installation and personnel.

LOCATION

Previous studies and preliminary plans have been prepared by others for locations both at Jehemy Beach at the south side of the Island and at Coast Guard Beach on the north side of the Island. Both these locations are on the easterly end of the Island.

A report by F. P. Shepard and D. L. Inman of Scripps Institution of Oceanography[1/] recommends the use of Coast Guard Beach in order to minimize the effects of swells resulting from storms coming north along the coast. It is apparent from the wave roses shown in Plate 1, and the wave refraction diagrams included in the above report, that the wave action on Coast Guard Beach results in normally rougher water at that location. Jehemy Beach, while calmer under normal conditions, is exposed to the action of the swells ariving from the south and these are the ones which, while only occasional, can be expected to be more destructive in effect.

The recommendation of Drs. Shepard and Inman has been followed, therefore, and the location selected is Coast Guard Beach.

1/ Preliminary Report on the proposed sites at San Nicolas Island by F. P. Shepard and D. L. Inman, Scripps Institution of Oceanography, 1949.

REQUIREMENTS

The basic requirement is to provide a ramp for the bow unloading of surface craft such as L.S.T., L.S.M., and L.S.U., with drafts as listed in Exhibit A.

A desirable adjunct would be a derrick for boom unloading of items not handled by truck. This feature has been incorporated in Schemes I and II, but is lacking in Scheme III as presented.

A further requirement is the provision of a float for tying up small craft.

In order to provide shelter from the predominant waves from the north coast, a breakwater is planned as indicated on the accompanying drawing.

A one-way truck roadway from the landing, connecting to the existing road, is also required. The maximum grade of this roadway is to be 10%.

ALTERNATE SOLUTIONS

SCHEME I

This study is based upon the construction of a breakwater as shown by the solid lines of the accompanying drawing. The breakwater is approximately 900' in top length, with a basic top width of 12', which is increased to 16' for the roadway portion. The elevation of the roadway portion is tentatively placed at 16' above MLLW, while the remainder of the breakwater is at elevation 14'. This is done to minimize the effect of wave action on the roadway.

A pier structure 18' wide is planned to parallel a modified pontoon barge landing which consists of one 5 x 18 barge, with one hinged end supported at the end of a fixed ramp forming part of the pier structure, and a float 5 x 15, with an end sloping to receive the bow ramp of the landing craft. The pier structure extends sufficiently past the end of the float to permit the use of a derrick for the transfer of non-truck-loaded material. Small craft can tie up to the side of the barge.

The barge is maintained in position by steel guide piles, driven into the underlying sandstone. The pier structure consists of steel bearing pile bents, with timber stringers and deck. The design live load is 250 lbs. per sq. ft. or H-10 wheel loadings. The angle of the pier has been chosen to reduce the length of the breakwater roadway required and to ease the approach from the deeper off-shore

waters. The prevailing wind is shown by the wind rose on Plate 2. Examination of the wave action shown on Plate 3, indicates that the breakwater should give adequate protection from such saves.

Plate 9 illustrates the wave action resulting from the infrequent storms from the south. It is anticipated that these swells approaching the landing craft from the stern would be less disturbing than if approaching from the quarter.

SCHEME II

This plan is based upon the preliminary study shown on a Y & D Drawing dated 29 December, 1950. Basically, it provides the same facilities in the same manner as Scheme I, the difference being in the location and bearing of the pier and the bearing of the breakwater and section. This scheme necessitates a longer breakwater roadway than does Scheme I. The axis of the landing more nearly approaches the bearing of the prevailing winds, but it is at a substantial angle to the approach of swells from the southern storms, which are refracted around the sand spit.

SCHEME III

This approach eliminates the pier structure and breakwater roadway and utilizes a three unit pontoon barge floating landing with reinforced concrete shore anchorage abutment.

This plan necessitates the roadway being in a different location from one using the breakwater top and results in a better alignment and more easily constructed connection to the existing Island sound. The alignment of the landing is such as to indicate that the prevailing winds will be nearly abeam of the landing craft, and also that the southern swells will be off the stern quarter.

Scheme III does not provide any method of off-loading other than by bow unloading. Since there is no pier, there is no derrick and boom. The accompanying quantity survey plate shows a comparison of materials necessary for the construction of each of the three schemes.

CONCLUSIONS AND RECOMMENDATIONS

From the quantity survey, it is indicated that Scheme III would be the most economical from a construction viewpoint. This plan, however, does not provide the derrick which is desired and does not provide a pier structure which might be desirable for some uses. The roadway involves less difficulty in construction and is not subject to the hazards attendant upon a top of the breakwater roadway. The landing alignment, however, is across the prevailing winds and at an angle with the southern swells.

Scheme II involves somewhat less rock work and a longer roadway on the top of the breakwater than does Scheme I. The alignment is favorable to the prevailing winds, but not so favorable to the southern swells.

Scheme I appears to satisfy all the basic requirements and has some advantages over Scheme II with regard to alignment, roadway length, approach from deeper water and the action on moored craft of swells resulting from southern storms.

It is recommended that Scheme I be used as the basis for the working drawings.

Respectfully submitted,

AINSWORTH-DOUGLAS-FREEMAN-WILSON & WILSON

By

Win E. Wilson

San Nicolas Island, 12 March, 1951

PRELIMINARY STUDIES

BREAKWATER AND LANDING

SAN NICOLAS ISLAND

ESTIMATED QUANTITIES

ITEM	UNITS	ALTERNATE SCHEMES		
		I	II	III
ROCK	TONS	97,000	88,000	90,000
STRUCT. STEEL	TONS	50	48	———
BEARING PILES	Nº	72	68	———
	LIN. FT.	2300	2400	———
GUIDE PILES	Nº	4	4	12
	LIN. FT.	150	160	360
FENDER PILES	Nº	7	7	
	LIN. FT.	220	240	———
LUMBER	M.B.F.	82	80	———
PONTOONS	Nº	129	129	232
ROAD ON BREAKWATER	LIN. FT.	425	565	———
ROAD ON SHORE	LIN. FT.	1000	1000	750

AINSWORTH - DOUGLAS - FREEMAN - WILSON & WILSON

ARCHITECTS - ENGINEERS

C O P Y

EXHIBIT A

OFFICER-IN-CHARGE OF CONSTRUCTION
BUREAU YARDS & DOCKS CONTRACTS
U.S. NAVAL AIR MISSILE TEST CENTER
POINT MAGU, CALIFORNIA

In Reply Address
Officer-in-Charge
of Construction
U.S. Naval Air Missile
Test Center
Point Magu, California

And Refer To:
A1/1/RL:ew

2 March, 1951

MEMORANDUM

From: Officer-in-Charge of Construction
To: Resident Officer-in-Charge of Construction

Subject: San Nicolas Pier and Breakwater Design

1. Mr. Wilson of the A&E firm of Ainsworth, Douglas, Freeman, Wilson and Wilson, requested by telephone this date, the draft of the bow unloading type ships which the Navy would use for logistic support of San Nicolas Island. Mr. Wilson was furnished the information listed below as received from the Island Facilities Officer:

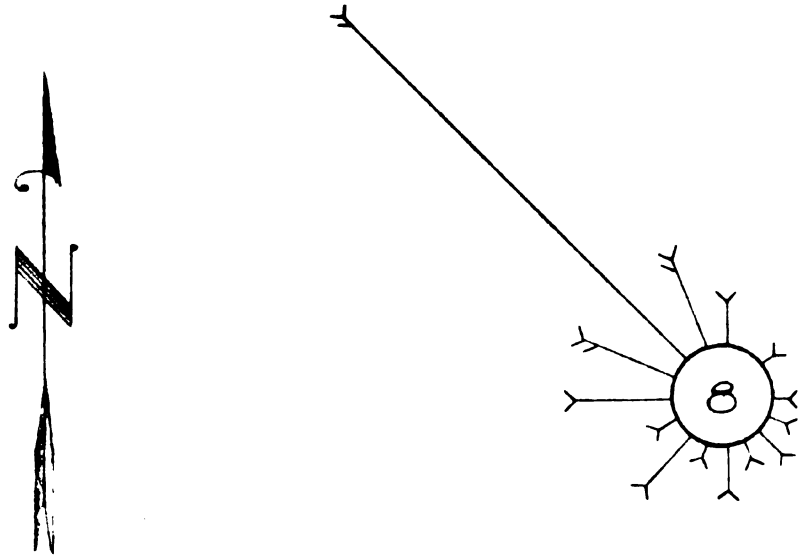
	Draft		
Type	Bow	Stern	
LST	8'	14' 4"	- seagoing
	3' 1"	9' 6"	- local use
LSM	4' 5"	7'11"	- seagoing
	3' 5"	6'11"	- local use
LSU	3' 4"	4'	- in landing

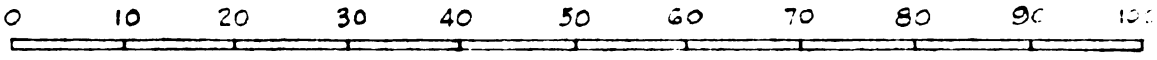
In so far as the LST was concerned, Mr. Wilson was told to use the drafts for "local use".

R. LAMOREAUX

Copy to:
Island Facilities Officer
APWO
Engineering & Design Supt.
Ainsworth, Douglas, Freeman,
Wilson & Wilson
1041 Green Street

SAN NICOLAS ISLAND
WIND ROSE





THE WIND PERCENTAGES WERE CONCENTRATED UPON 16 POINTS. THE ARROWS FLY WITH THE WIND. THE LENGTH OF THE ARROW MEASURED FROM THE OUTSIDE OF THE CIRCLE ON THE ABOVE SCALE GIVES THE NUMBER OF TIMES IN EACH 100 OBSERVATIONS THAT THE WIND HAS BLOWN FROM OR NEAR THE GIVEN POINT. THE NUMBER OF FEATHERS SHOW THE AVERAGE FORCE OF THE WIND ON THE BEAUFORT SCALE (E.I., ONE FEATHER DENOTES FORCE OF ONE, ETC.) THE FIGURE IN THE CENTER OF THE CIRCLE GIVES THE PERCENTAGE OF CALMS.

THIS CHART WAS TAKEN FROM PILOT CHART OF THE NORTH PACIFIC OCEAN NO. 1401, ISSUED BY THE NAVY DEPARTMENT, DATED SEPTEMBER, 1940